with aluminized polyester tapes (traded as MILAR), wrapped around the inner pipe.

The following materials were also contained in the jacket:

10 g of a $BaLi_4$ alloy according to the European Patent Application 92830186, in the form of granules (small pellets) arranged in a thermo-retractable container 17 as disclosed in the European Patent Application 92830185, placed in the getter compartment 16;

20 g of BaO (18), freely dispersed in the jacket; and

0,75 g of PdO granules, wrapped in a porous metallic packet 19, fixed onto the wall of the getter compartment 16.

The vacuum jacket was connected, by means of valve 20, to an outer pumping system, consisting of a diffusion and rotary pump, and checked for tightness, by means of a leak detector having a sensitivity of 5×10^{-12} Pa m^3/s.

Pumping was then maintained for 15 h, blowing the inner pipe with hot air at 100°–120° C., to promote the degassing of the multilayer insulating material and, finally, the getter compartment 16 was heated at 120° C. by means of an external tape heater, thus causing the getter activation.

After 30 min. of activation, the jacket was isolated from the pumping system, by closing valve 19, and the pressure was recorded versus the time.

The results of this test are plotted in FIG. 5.

DISCUSSION

By comparing lines 1 and 3 of FIG. 2, it can be observed that applying the technique according to the invention allows for a substantial reduction of the pressure increase accurring in the cryogenic device after its sealing. A few analytical tests, carried out by means of a mass spectrometer, showed that the combined use of the two materials, drying agent and getter, does not only allow to quantitatively sorb the water outgassed by the insulating material, but also to face the leaks in the device. Further it should be appreciated that the tests were performed under accelerated conditions, namely under a more drastic condition, as to the load of atmosheric gases, with respect to those occurring in the practice. Therefore an accelerated test lasting 360 h (515 days) is equivalent to at least 20 years of actual working.

In the case of a cryogenic device, in which the leak rate is substantially lower and normally less than 10^{-10} Pa$\times m^3/s$, the pumping action exerted by the getter materials leads to an appreciable pressure drop after the sealing of the jacket, as shown by the line in FIG. 5.

It is understood that optional additions and/or changes can be carried out by those skilled in the art, with respect to the operative conditions hereinabove, without departing from the scope and spirit of the claimed invention.

What we claim is:

1. A process for producing an improved thermally insulating jacket, having an inner wall and an outer wall, and having an inner space between said walls containing an insulating material, wherein said inner space also contains a moisture sorbing material and a getter material, wherein said moisture sorbing material is a moisture sorbing material, having a H_2O vapor pressure lower than 1 Pa at room temperature, characterized by the following steps:

A. evacuating the inner space of the jacket down to a pressure lower than 100 Pa by means of a vacuum

pump having a connection between the pump and the inner space of the jacket;

B. exposing said inner space contemporaneously to said moisture sorbing material while keeping the getter in an inactivated form;

C. evacuating said inner space farther, down to a pressure lower than 5 Pa, by means of the vacuum pump;

D. activating said getter; and

E. isolating the jacket from the vacuum pump, by sealing the connection between said vacuum pump and the inner space of the jacket.

2. A process according to claim 1 characterized in that during the exposing of step B, the evacuating according to Step A is discontinued.

3. A process according to claim 2 wherein step B lasts from about 2 to about 48 hours.

4. A process according to claim 1, characterized in that during the Steps A and B, the inner wall is kept hot at a temperature of not higher than 150° C. thus promoting the release of water from the insulation material.

5. A process according to claim 4 wherein step B lasts from about 2 to about 48 hours.

6. A process according to claim 1, characterized in that the step B lasts for up to 48 hours.

7. A process according to claim 1 characterized in that said moisture absorbing material and said getter are lying, in separate locations, against the outer wall of said jacket.

8. A process according to claim 7 characterized in that said moisture sorbing material and said getter are arranged in a container subdivided into an inner zone and an outer zone by a porous septum, wherein:

the inner zone contains said getter;

the outer zone is communicating with the inner zone containing said insulating material and contains said moisture sorbing material which prevents the passage of water vapour through said septum and towards said getter.

9. A process according to claim 8 characterized in that said container is a vertical box having an opening at its uppermost portion and a planar septum.

10. A process according to claim 8 characterized in that said container is a toroidal box having a radial or planar septum.

11. A process according to claim 9, characterized in that said septum is horizontal.

12. A process according to claim 8, characterized in that said container is a rigid, semirigid or flexible box.

13. A process according to claim 8, characterized in that said container is made from a substantially water-free material, selected from the group consisting of metal, glass, ceramics and combinations thereof.

14. A process according to claim 1, characterized in that said getter material is an alloy having the formula $BaLi_4$.

15. A process according to claim 1 wherein step B lasts from about 2 to about 48 hours.

16. A process according to claim 1, characterized in that said septum is horizontal.

17. A jacket of claim 1 wherein said moisture sorbing material is selected from the group consisting of barium oxide, strontium oxide, phosphorous oxide, and mixtures thereof.

18. An improved thermally insulating jacket, having an inner wall and an outer wall, and having an inner space between said walls completely or partially filled

with an insulating material, wherein said inner space also contains:

A. a moisture sorbing material selected from the group consisting of barium oxide, strontium oxide, phosphorous oxide, and mixtures thereof; and

B. a getter material which is an alloy of the formula $BaLi_4$.

19. An improved thermally insulating jacket, having an inner wall and an outer wall, and having an inner space between said walls completely or partially filled with an insulating material, wherein said inner space also contains:

A. a moisture sorbing material selected from the group consisting of barium oxide, strontium oxide, phosphorous oxide, and mixtures thereof; and

B. a getter material which is an alloy of the formula $BaLi_4$; and

C. a hydrogen converter selected from the group consisting of osmium oxide, iridium oxide, ruthenium oxide, rhodium oxide and palladium oxide.

20. An improved thermally insulating jacket, having an inner wall and an outer wall, and having an inner space between said walls completely or partially filled with an insulating material, wherein said inner space also contains:

A. a moisture sorbing material which is barium oxide; and

B. a getter material which is an alloy of the formula $BaLi_4$; and

C. a hydrogen converter which is palladium oxide.

* * * * *

add A7

add B7

add C7